PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 31 AUG 2005
WIPO PCT

PCT

To:
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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Applicant's or agent's file reference 5869-039	Date of mailing (*day/month/year*) 29 AUG 2005 **FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date (*day/month/year*)	Priority date (*day/month/year*)
PCT/US04/37409	10 November 2004 (10.11.2004)	11 November 2003 (11.11.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC(7): H04M 1/00,9/00,9/08 and US Cl.: 379/406.01

Applicant

MATECH INC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☐ Box No. VIII — Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US
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Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:
   - ☐ paid additional fees
   - ☐ paid additional fees under protest
   - ☒ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
   - ☐ complied with
   - ☒ not complied with for the following reasons:

   See the lack of unity section of the International Search Report(Form PCT/ISA/210)

4. Consequently, this opinion has been established in respect of the following parts of the international application:
   - ☐ all parts.
   - ☒ the parts relating to claims Nos. 1-27

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Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims NONE	YES
	Claims 1-3,5-7,11-13,19,22	NO
Inventive step (IS)	Claims NONE	YES
	Claims 1-27	NO
Industrial applicability (IA)	Claims 1-27	YES
	Claims NONE	NO

2. Citations and explanations:

Please See Continuation Sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

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Supplemental Box
In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1-3,5-7,11-13,19,22 lack novelty under PCT Article 33(2) as being anticipated by Hietanen (6415034). Hietanen discloses a two way communication device for use in an ear. The device comprises a dsp that implements an adaptive algorithm to generate filter coefficients that are used to subtract (examiner reads an adder and subtractor as the same device) an echo signal from the transmitted signal (Col 5 lines 25-45, Col 7 lines 5-22). The dsp monitors the transmission and reception through transducers. Since the DSP is digital it inherently operates periodically (as per the clocking rate). The device further comprises a VOX (Fig. 4 items 30,32) to control the gain of the transmitted and received signals. The device further comprises A/D and D/A converters 31,33,35,39. The device further comprises a compensation filter (within DSP 34) used to simulate the echo that is subtracted from the outgoing signal (Fig. 3). The adaptive filter (dsp) is reconfigured (adapted) after a predetermined amount of time (determined by the clocking rate).

Claims 4,8-10,14,20,21,23-27 lack an inventive step under PCT Article 33(3) as being obvious over Hietanen (6415034) in view of Fang et al. (6480610). Hietanen discloses a two way communication device, however, Heitanen does not disclose that the echo cancellation system comprises a test signal being switched on in order to set the parameters of a second filter (in addition to the adaptive echo estimation filter). Fang discloses an improved echo cancellation algorithm in an ear device. The A/D, D/A converters inherently comprises a low pass filter for the purpose of filtering the output digital signal and the system further comprises attenuators 570a,570m to attenuate both the transmitted and received signals based on a power control. The echo cancelling algorithm comprises utilizing a second filter (training filter) in addition to the primary adaptive filter (Col 4 lines 14-47). The training filter is set by using a training signal impulse that is switched in (switches 594a-594m Fig. 5). Both the training and adaptive filters are periodically updated to adapt for changes in the echo paths. It would have been obvious to utilize the improved echo cancellation algorithm of Fang for the purpose of achieving improved echo cancellation in the device of Hietanen.

Claims 15-18 lack an inventive step under PCT Article 33(3) as being obvious over Hietanen (6415034) in view of Fang et al. (6480610) and further in view of Schultz et al. (6357292). Hietenan and Fang disclose a two way communications device with a digital echo canceller that utilizes a switchable test signal, but they do not disclose that a single transducer is used to transmit and receive information. Schultz discloses a duplex transducer (Fig. 21) coupled to resistive bridge 1322 (Col 27 line 55 to Col 28 line 33) with each direction of communication coupled to a differential amplifier 1132,1334. It further would have been obvious to implement capacitors along with the resistors for the purpose of reducing any high frequency noise from the system. Schultz further discloses a variable resistance element used in order to adjust the transducer circuitry (Col 6 lines 30-45). It would have been obvious to implement a single transducer in the device of Hietanen in view of Fang for the purpose of reducing the number of transducers needed for the device to operate (saving cost).

Claims 1-27 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in the communications industry.